REMARKS

The Official Action dated August 28, 2002 has been received and it's contents carefully noted. In view thereof, by this amendment claims 1, 4, 7, and 10 have been amended to better define that which the Applicant regards as the invention. Accordingly, claims 1, 3, 4, 6, 7, 9, 10, and 12 are presently pending in the instant application.

In that the present Amendment is being filed concurrently with the filing of a Request for Continued Examination, it is respectfully requested that the foregoing amendments be entered and fully considered by the Examiner and the application be passed to issue. In response to the Official Action dated August 28, 2002, Applicant provides the following comments.

With reference to paragraph 3 of the Official Action, claims 1,3,4 and 6 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,595,627 issued to Inazawa et al. in view of U.S. Patent No. 6,297,163 issued to Zhu et al. This rejection is respectfully traversed in that the combination proposed by the Examiner neither discloses nor remotely suggests that which Applicant regards as the invention.

As the Examiner can readily appreciate, a novel feature of presently amended claims 1 and 4 resides in comprising the step of using a fluorocarbon gas alone as a processing gas for etching a silicon dioxide film, wherein the fluorocarbon gas is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases.

Turning to the cited references, Inazawa et al. discloses, as a processing gas, a gas mixture including a fluorocarbon gas composed of C_4F_8 gas mixed with CO gas. However, Inazawa is silent about the step of using a fluorocarbon gas alone as a processing gas.

As to the teachings of Zhu et al., this reference discloses sets forth in column 2, lines 29-33 and column 3, lines 22-25, a gas mixture including a fluorocarbon gas composed of C_5F_8 mixed with CO gas. Likewise, Zhu et al. does not disclose nor

remotely suggest the step of using a fluorocarbon gas alone as a processing gas. Specifically, Zhu et al. teaches in column 6, lines 35-44 that by using a gas mixed fluorocarbon gas with CO gas, the selectively of etching is improved.

In view of the foregoing, clearly, neither Inazawa et al. nor Zhu et al. references teach the step of using a fluorocarbon gas alone as a processing gas, as recited in amended claims 1 and 4. Moreover, in that both of the references use the gas mixed a fluorocarbon gas with CO gas such references would teach one of ordinary skill in the art away from using a fluorocarbon gas alone as a processing gas as is specifically recited by Applicant's claimed invention..

With reference now to paragraph 4 of the Official Action, claims 7, 9, 10 and 12 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,244,730 issued to Nguyen et al. in view of U.S. Patent No. 6,184,572 issued to Mountsier et al. This rejection is respectfully traversed in that the combination proposed by the Examiner neither discloses nor remotely suggests that which Applicant regards as the invention.

Again, as the Examiner can appreciate, a feather of the amended claims 7 and 10 resides in the step of depositing an organic film using a fluorocarbon gas composed of at least one of C_4F_6, and C_5F_8 gases.

On the other hand, though the Nguyen et al. reference discloses a step of depositing an organic film using a fluorocarbon gas composed of C_4F_8, Nguyen does not disclose or suggest the use of either C_4F_6 and C_5F_8 gases.

Though the Mountsier et al. reference discloses a fluorocarbon gas composed of C_6F_6 or C_4F_8, this reference is likewise silent with respect to the use of either C_4F_6 and C_5F_8 gases.

Accordingly, in that Applicant's claimed invention as recited in claims 7, 9, 10 and 12 is neither disclosed in nor suggested by the combination as proposed by the Examiner, in is respectfully submitted that each of claims 7, 9, 10 and 12 clearly distinguish over the prior art combination and are in proper condition for allowance

in that neither of the cited references disclose or suggest the use of either of C_4F_6 and C_5F_8 gases.

Therefore, in view of the foregoing, it is respectfully requested that the rejections of record be reconsidered and with drawn by the Examiner, that claims 1, 3, 4, 6, 7, 9, 10 and 12 be allowed and that the application be passed to issue.

Should the Examiner believe a conference would be of benefit in expediting the prosecution of the instant application, he is hereby invited to telephone counsel to arrange such a conference.

Respectfully submitted,

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MARKED-UP VERSION OF THE AMENDED CLAIMS

1. (Twice Amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system, a silicon dioxide film having been formed on the surface of the substrate;

introducing a fluorocarbon gas alone into the reaction chamber, wherein the fluorocarbon gas [contains] is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases; and

creating a plasma from the fluorocarbon gas and etching the silicon dioxide film with the plasma,

wherein a residence time τ of the fluorocarbon gas in the reaction chamber is controlled at a value greater than 0.1 sec and equal to or less than 1 sec, the residence time τ being given by P x V/Q, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit: Pa · L/sec) of the fluorocarbon gas.

4. (Twice Amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system, a silicon dioxide film having been formed on the surface of the substrate;

introducing a fluorocarbon gas alone into the reaction chamber, wherein the fluorocarbon gas [contains] is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases; and

creating a plasma from the fluorocarbon gas and etching the silicon dioxide film with the plasma,

wherein PxW_0/Q is controlled at a value greater than $0.8x10^4$ sec·W/m^3 and equal to or less than $8x10^4$ sec·W/m^3, PxW_0/Q being a product of a residence time τ of the fluorocarbon gas in the reaction chamber and a power density Pi of power applied to create the plasma, the residence time τ being given by PxV/Q, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: Pa ·

L/sec) of the fluorocarbon gas, the power density Pi being given by W_0/V, where W_0 is a magnitude (unit: W) of the power and V is the volume (unit: L) of the reaction chamber.

7. (Twice Amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system;

introducing a fluorocarbon gas into the reaction chamber, wherein the fluorocarbon gas [contains] is composed of at least one of C_4F_6[,] and C_5F_8[, and C_6F_6] gases; and

creating a plasma from the fluorocarbon gas and depositing an organic film on the substrate using the plasma,

wherein a residence time τ of the fluorocarbon gas is controlled at 0.1 sec or less, the residence time τ being given by PxV/Q, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit: Pa · L/sec) of the fluorocarbon gas.

10. (Twice Amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system;

introducing a fluorocarbon gas into the reaction chamber, wherein the fluorocarbon gas [contains] is composed of at least one of C_4F_6[,] and C_5F_8[, and C_6F_6] gases; and

creating a plasma from the fluorocarbon gas and depositing an organic film on the substrate using the plasma,

wherein PxW_0/Q is controlled at $0.8x10^4$ sec · W/m^3 or less, PxW_0/Q being a product of a residence time τ of the fluorocarbon gas and a power density of Pi of power applied to create the plasma, the residence time τ being given by PxV/Q, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: L) of

the reaction chamber and Q is a flow rate (unit: Pa·L/sec) of the fluorocarbon gas, the power density Pi being given W_0/V, where W_0 is a magnitude (unit: W) of the power and V is the volume (unit: L) of the reaction chamber.